reference value which corresponds to said target traveling speed, said automatic braking device being operated according to said reference value to reduce said actual traveling speed to said target traveling speed.

110 Cancel

15. (New) The operating unit according to Claim 14, further comprising traveling speed detection means provided in said vehicle which detect said actual traveling speed of said vehicle and output an output signal to said automatic braking device to permit reduction of said actual traveling speed to said target traveling speed.

REMARKS

Applicant hereby cancels Claims 1, 2, 6 and 7 without prejudice and add Claims 11-15. Additionally, Claims 3-5 and 8-10 are amended. Attached hereto is a "Marked-up Version of Amendments" showing the changes made to portions of the specification and/or claims by the current amendment. In view of the following discussion, Applicant requests consideration of Claims 11-15, reconsideration of original Claims 3-5 and 8-10 and submits that all of said claims are in condition for allowance.

Claims 1-7 are rejected based upon the use of the term "and/or". The claims as amended herein no longer include this term and thus, withdrawal of the Section 112 rejection is respectfully solicited.

With respect to the claim rejections based upon the references of record, it is noted that Claims 1-4, 6 and 7 are rejected as being obvious. As to pending Claim 5, this claim is indicated as being rejected on the cover sheet of the Office Action but is not included in the specific rejections set forth in the body of the Office Action. Additionally, Applicant notes that Claims 8-10 as originally filed remain pending in this application but are not listed on the Office Action cover sheet. Specific consideration of these claims is requested in the next Office Action.

More particularly as to the rejections, independent Claims 1, 2, 6 and 7 are hereby cancelled and replaced with Claims 11-15 respectively. The dependencies of Claims 3-5 are amended to depend from Claim 11, while the dependency of Claim 8 is amended to depend from Claim 12.

Specifically in the Office Action, original Claims 1-4, 6 and 7 are rejected under 35 USC 103 as being unpatentable over the James '794 patent. However, Applicant respectfully submits that James does not disclose, teach or suggest Applicant's claimed invention since it specifically deals with a complex system for controlling individual vehicles along an entire stretch of highway including routing of the vehicles and driving of the vehicles. Applicant's invention generally relates to an operating unit for automatically braking a vehicle upon the detection of an emergency condition occurring in the roadway wherein the claimed system structurally and functionally differs from James and the remaining art of record.

More particularly, James discloses an automated highway system, which includes a number of vehicles configured for the system such that the steering, acceleration and braking of all of the vehicles is controlled by the automated highway system. This highway system includes mobile transponders 52 on each of the vehicles which mobile transponders are adapted to both receive and transmit information to a system of stationary transmitters and receivers spaced intermittently along the highway. The system of stationary transmitters and receivers is connected to a processor output buffer of the stationary local processor which local processor produces a plurality of outputs for the stationary transmitters.

Additionally, the local processor is connected to an advanced traffic management system which oversees and controls all of the vehicles. The stationary roadside system processes data from the receivers which data identifies and tracks the vehicles along the roadway and generates vehicle control signals to be sent back to the vehicle. As disclosed in

Column 5 of James, the vehicle includes numerous actuators to control steering, acceleration and braking and has a vehicle processor 50 which continuously receives commands from the roadside transmitters. For example, Column 6 discloses that the system on the roadside locates and tracks vehicles and transmits "navigation" instructions to the vehicles. This effectively provides real time control of the vehicle wherein the actual actions to be taken by the vehicle are controlled by commands transmitted from the roadside transmitters to the receiver on the vehicle itself.

While James discusses correcting the vehicle travel based upon road conditions, traffic and weather, Column 7, Lines 63-66 discloses that this information comes from the ATMS controller which controller is a centralized controller connected to the various roadside transmitters and receivers. Thus, the roadside transmitters and receivers do not detect local conditions but only receive general information from the ATMS. Further, the central vehicle commands are not generated by the vehicle but only by the roadside components. In particular, Column 9, Lines 31-34 disclose that:

> "Vehicle position information is processed to formulate vehicle actuator commands, and is then routed to the processor output buffer for transmission."

As indicated, the roadside components actually develop the actuator commands and then transmit these commands to the vehicle. This arrangement is believed to distinctly differ from Applicant's claimed invention as discussed herein.

As to independent Claim 11, this claim defines an operating unit for a vehicle traveling on a road comprising a first group of components situated on and associated with the roadway. This first group of components includes detection means provided adjacent to the road for detecting a danger state and outputting a detection signal. This detection signal is received by a transmitter which then transmits a transmitter signal based on the detection signal. Additional

components are provided on the vehicle to receive and act upon this transmitter signal. Specifically, the vehicle has antilock brakes wherein an automatic braking device is provided on the vehicle to control the antilock brakes based upon the generation of the transmitter signal.

More particularly, a receiver is provided on the vehicle which receives the transmitter signal and outputs a control signal upon reception of this transmitter signal. The automatic braking device receives the control signal and the automatic braking device is operated based upon receipt of the control signal in order to operate an automatic brake of the antilock brakes. This produces a braking force. Further, the automatic braking device operates such that when an actual traveling speed of the vehicle exceeds a target traveling speed after the control signal is received, the automatic braking device operates to automatically reduce the actual traveling speed to the target traveling speed by the operation of the automatic braking device. This speed reduction may occur instantaneously or soon thereafter.

This claimed emergency operating unit distinctly differs from the comprehensive highway system disclosed in James.

More particularly, the claimed operating unit requires a detection means and transmitter on the road to detect a danger state at the road. The detection means then generates a detection signal that causes the transmitter to transmit a transmitter signal. These components monitor the conditions located directly adjacent to the road and then sends the transmitter signal to warn the approaching vehicle.

As to James, the highway system completely differs in that this system does not include detectors adjacent to the roadway. While reference is made in the James patent to weather conditions, no physical structure is disclosed adjacent to the road which is able to actually monitor and detect a danger state in the roadway. Rather, general weather information is believed to be provided throughout the entire system from the central ATMS controller and then is

transmitted along the roadway to the various vehicles located thereon. This system is not intended to nor is it capable of detecting a localized danger state directly along the roadway.

Additionally, the automatic braking device on the vehicle of the claimed operating unit is operated based upon receipt of a control signal from a receiver wherein the automatic braking device operates to automatically reduce the actual traveling speed of the vehicle to a target traveling speed. The monitoring of the actual traveling speed and the reduction to the target traveling speed is conducted onboard the vehicle.

In James, however, the highway system of James monitors and calculates conditions for all of the vehicles in the stationary portion of the system and then sends specific control signals to the individual vehicles. Furthermore, the James system operates on a completely different principal of sending actuator commands to the vehicle to actuate the vehicle as necessary to a desired track and speed of the vehicle. This does not occur upon detection of a single danger state signal but instead operates upon a complex algorithm which determines all of the variables in the entire system including additional vehicles and then constantly modifies the actuator signals to perform minute adjustments of the vehicles' driving characteristics. Further, the signals sent to the vehicles comprise multiple individual commands for the vehicle.

In Applicant's claimed invention, the detection of the danger state transmitter signal by the vehicle automatically causes the automatic braking system to effect a change in a slowing of the vehicle speed to the target traveling speed. This structurally and functionally is used to slow the vehicle to the target traveling speed automatically after the detection of the danger state has occurred. This is a safety system provided to stop vehicles as soon as possible. The James system therefore structurally and functionally differs to control multiple vehicles along an entire highway section.

Still further, the automatic braking system of Applicant's claimed invention is connected to the antilock brake system. This allows for quick stopping of the vehicle through the safety of the antilock brake system. This is not believed to be an obvious design choice as suggested in the Office Action.

Even if the antilock brake system was provided on a vehicle, such antilock brake systems are connected to a conventional brake pedal. This does not suggest connecting the antilock brake system also to an automatic braking device which braking device is connected to a receiver. The mere fact that the antilock brake system might be connected to an automatic control system does not make this obvious.

In view of the foregoing, independent Claim 11 is believed in condition for allowance. For these reasons alone, dependent Claims 3, 4 and 5 are allowable.

Additionally, dependent Claims 3-5 define additional features which are not disclosed, taught or suggested by the prior art of record.

For example, Claim 3 defines reference value setting means in the vehicle for setting a reference value corresponding to the target traveling speed, wherein the automatic braking device is operated according to the reference value set by the reference value setting means. As referenced above, the James system does not store a target traveling speed on the vehicle or more particularly include a value setting means on the vehicle which stores a reference value for the target traveling speed. Rather, James transmits multiple control signals for the steering, acceleration and braking actuators of the vehicles from the stationary transmitters to the vehicle receivers so that a constant flow of commands is transmitted to the vehicle. Thus, even if the James system were able to detect a danger state and order all vehicles to stop, this still would be accomplished by sending a stream of commands to the individual vehicles to slow the vehicles down. The claimed system, however, uses a distinctly

different system wherein the presence of a transmitter signal which is indicative of a danger state causes the vehicle to automatically slow the vehicle from the actual traveling speed to the target traveling speed which traveling speed data is stored onboard of the vehicle and travels therewith.

As to Claim 4, Claim 4 further defines traveling speed detection means being provided on the vehicle which detection means outputs an output signal which is transmitted until this output signal reaches a value corresponding to the target traveling speed.

As to Claim 5, Claim 5 defines detection means comprising temperature detection means. As referenced above, the James system does not include detectors directly adjacent to the highway on the roadway for detecting isolated conditions at the detector. The mere fact that the central highway control system might provide data as to weather does not disclose, teach or suggest providing individual temperature detection means adjacent to the roadway.

These features as defined above are not believed to be disclosed, taught or suggested by the prior art of record and accordingly, all of Claims 1 and 3-5 are believed allowable.

Additionally, added Claim 12 is provided which defines system components which are similar to those defined in Claim 11. The above described comments relative to Claim 11 are equally applicable to Claim 12 and for these reasons, Claim 12 is believed allowable. Additionally, Claim 12 defines that an alarm unit is provided which generates an alarm to the inside of the vehicle.

In the James system, however, it is believed that an alarm would not be provided in the vehicle since the control system controls all of the operation of the vehicle. The occupants of the vehicle, if any are present, do not participate in operation of the vehicle and thus, an alarm would not believed to be provided for the occupants in this system. In Applicant's invention, however, the occupants are involved in operation of the vehicle and thus, the alarm would

be provided so that they are aware as to the reason for the automatic braking of the vehicle. As such, Claim 12 is also believed to be allowable based upon this additional inventive feature.

Applicant also adds Claims 13-15. Independent Claim 13 defines an operating unit for a vehicle which includes a detection means provided adjacent to the road for detecting a danger state within the road. The detection means outputs a detection signal and is received by a transmitter which then transmits a transmitter signal along the road. Each vehicle includes an antilock brake system which is operated by a manual actuator within a compartment of the vehicle and is operable by an operator to effect manual operation of the antilock brake system. Further, an automatic braking device is provided on the vehicle which is connected to the antilock control device to effect actuation of the wheel brakes independent of said manual actuator of the vehicle. As such, the wheel brakes are activated depending upon the presence or absence of the danger state which automatically reduces the actual traveling speed to the target traveling speed. In this regard, the automatic braking device includes a target speed setting device which stores the target traveling speed for the vehicle.

With this system, no outside control systems are required. Rather, all that is required is a detection means and a transmitter along the road which generates a transmitter signal which indicates the presence of a danger state. This transmitter signal is then received by the vehicle. The vehicle also includes a target traveling speed stored thereon in the automatic braking device wherein the transmitter signal which indicates the presence of a danger state thereby effects automatic reduction of the actual traveling speed to the target traveling speed. This occurs independently of the manual actuator which is normally used by the vehicle occupant to operate the brakes.

As discussed above relative to James, this reference as well as the remaining art of record does not disclose providing a roadside transmitter with detection means to continuously monitor the road conditions on the road. This detection means upon the detection of the presence of a danger state then transmits by warning signal to vehicles. As discussed above, James does not include localized detectors but instead has a master controller for the system which monitors weather and then sends signals along the roadway to the various transmitters. This arrangement distinctly differs from the claimed invention.

Further, the vehicle in the claimed system maintains the target traveling speed onboard and automatically reduces the actual traveling speed to the target traveling speed upon receipt of a transmitter signal that indicates the presence of a danger state. The James system, however, develops the individual commands in the stationary portion of the system and then transmits multiple commands to the vehicles to control a variety of factors including acceleration, steering and braking. These commands transmitted to the vehicle do not cause an automatic response in the vehicle but instead provide real time modifications to the system of actuators onboard the vehicle.

In view of the foregoing, it is believed that Applicant's claimed operating unit as defined by Claim 13 is patently distinguishable from the prior art of record. Additionally, dependent Claims 14 and 15 recite additional features which are disclosed, taught or suggested by the prior art. In particular, Claim 14 defines that the target speed setting device permits setting of a reference value which corresponds to the target traveling speed. The automatic braking device is operated according to this reference value wherein the storage of this setting value and the operation of the vehicle occurs onboard the vehicle. The James system is not believed to disclose, teach or suggest this arrangement since the commands are developed through the stationary portion of this

system wherein a set reference value is not determined by James but instead constantly changing commands are transmitted to the vehicle.

As to Claim 15, traveling speed detection means are provided on the vehicle which detect the actual traveling speed and then output an output signal. In James, however, speed calculations are believed to be determined through the tracking of the vehicles position through the stationary receivers. As such, Claim 15 is not believed to be disclosed, taught or suggested by the prior art of record.

In view of the foregoing, all of the pending claims are believed allowable.

Further and favorable consideration of this application is respectfully solicited.

Respectfully submitted,

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Encl: Marked-up Version of Amendments
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MARKED-UP VERSION OF AMENDMENTS

In the specification:

Paragraph beginning at page 2, line 9, is amended as follows:

Particularly, it is an object of the invention to automatically prevent a vehicle from entering a tunnel when a fire ~~brakes~~ breaks out in the tunnel, thereby improving the safety of the vehicle.

Paragraph beginning at page 6, line 15, is amended as follows:

In Figs. 1 and 2, a tunnel 1 is positioned at an appropriate location of a road 2 and forms a part of the road 2. The tunnel 1 is shown by a cross section in Fig. 1 wherein a part of the tunnel 1 is omitted, and the tunnel 1 forms a one way road. At least one temperature detection means 3 is installed on the upper portion inside the tunnel 1. The temperature detection means 3 has a function to detect the increase of a temperature when a fire ~~brakes~~ breaks out inside the tunnel 1, and outputs a temperature signal T1 when an atmospheric temperature exceeds a given temperature (e.g., 80°C) at the time when the fire broke out. Accordingly, the temperature detection means 3 can be formed of not only a temperature sensor but also a temperature switch for outputting the temperature signal T1 while a contact is closed when the atmospheric temperature exceeds the given temperature.

Paragraph beginning at page 9, line 7, is amended as follows:

Third and fourth check valves 61, 62 are connected to both sides of the pump 60 driven by a motor 60A and the pressure reduction passage 59 has the other end

connected to the second passage 55 at the connection point 59a and one end connected to the third passage 56 (wheel brake 53) via a reservoir 63 and a second selector valve 70. Accordingly, the pressure reduction passage 59 is provided ~~whiel~~ while detouring the first selector valve 58. The second selector valve 70 has a communication position f and a shut-off position g, and is normally positioned at the shut-off position g. Third and fourth check valve 61, 62 allows the brake fluid to flow from the side of the wheel brake 53 toward the side of the master cylinder 51 (accumulator 64). The brake fluid which enters from the wheel brake 53 inside the reservoir 63 can drive the pump 60 and then it can be discharged.

Paragraph beginning at page 9, line 29, is amended as follows:

One end of a suction passage 73 is connected to the pressure reduction passage 59 between the pump 60 and second selector valve 70. The suction passage 73 intervenes a charging valve 74 therein and has the other end connected to the ~~reservoir tank 51d~~ first passage 54, resulting in connecting the reservoir tank 51d of the master cylinder 51. The charging valve 74 has a communication position h and a shut-off position i and is normally positioned at the shut-off position i.

Paragraph beginning at page 12, line 10, is amended as follows:

The operation of the automatic braking device 6 when a fire ~~brakes~~ breaks out in the tunnel 1 is described now.

Paragraph beginning at page 12, line 12, is amended as follows:

When a fire ~~brakes~~ breaks out in the tunnel 1, the increase of an atmospheric temperature caused by the fire is detected by the temperature detection means 3, and the temperature detection means 3 outputs the temperature signal T1. The temperature signal T1 outputted by the temperature detection means 3 is inputted to the transmitter 4, and the transmitter 4 outputs the danger signal T2 which is received by the receiver 7 of the vehicle 8 which travels on the road 2 toward the tunnel 1. As a result, the receiver 7 outputs the control signal T3 based on which the automatic braking device 6 is controlled by the microcomputer 80.

Paragraph beginning at page 16, line 3, is amended as follows:

According to the fifth and eighth aspects of the invention, it is possible to prevent in advance the vehicle from traveling toward a fire spot when a fire ~~brakes~~ breaks out on a road, e.g. inside a tunnel so that the vehicle is avoided to be influenced by the fire. As a result, the safety of the vehicle is improved.

In the claims:

Claims 3-5 and 8-10 are amended as follows:

3. (Twice Amended) The operating unit ~~of a vehicle having an automatic braking device~~ according to Claim ~~1~~ 11, further comprising reference value setting means provided in the vehicle for setting a reference value corresponding to said target traveling speed, and wherein the automatic braking device is operated ~~based on a~~ according to the reference value ~~corresponding to a~~

~~target travelling speed~~ set by the reference value setting means based on the control signal.

4. (Twice Amended) The operating unit ~~of a vehicle having an automatic braking device~~ according to Claim ~~1~~ 11, further comprising travelling speed detection means provided in the vehicle for detecting ~~a~~ said actual travelling speed of the vehicle based on the control signal and outputting an output signal so as to operate the automatic braking device until the output signal reaches a value corresponding to the target traveling speed of the vehicle.

5. (Twice Amended) The operating unit ~~of a vehicle having an automatic braking device~~ according to Claim ~~1~~ 11, ~~further comprising at least one~~ wherein said detection means comprises temperature detection means ~~provided on the road~~ for detecting that an atmospheric temperature reaches a given temperature indicating said danger state and outputting ~~a temperature~~ said detection signal~~, and wherein the transmitter transmits the signal based on the temperature signal outputted by the temperature detection means~~.

8. (Amended) The operating unit ~~of a vehicle having an automatic braking device~~ according to Claim ~~6, further comprising~~ 12, wherein said detection means comprises at least one temperature detection means ~~provided on the road~~ for detecting that an atmospheric temperature reaches a given temperature indicating said danger state and outputting ~~a temperature~~ said detection signal~~, and wherein the transmitter transmits the signal in response to the temperature signal outputted by the temperature detection means~~.

9. (Amended) The operating unit ~~of a vehicle having an automatic braking device~~ according to Claim 8, wherein the temperature detection means is provided in a vehicle tunnel.

10. (Amended) The operating unit ~~of a vehicle having an automatic braking device~~ according to Claim 9, wherein the transmitter is provided at one of ~~the~~ a position of an opening portion serving as an approach to the tunnel and ~~the~~ a position remote from the opening portion ~~serving as the approach to the tunnel~~ by a given distance.